

**Burlington Environmental, Inc.  
(Chempro)  
Pier 91 Facility**

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8-26-92  
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**Environmental Protection Agency  
Identification Number:**

**WAD 00081 2917**

**PERMIT  
for the  
Storage and Treatment of Dangerous Waste**

**Issued by:**

**Washington Department of Ecology**

**Effective date: August 26, 1992**

USEPA RCRA



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RCRA PERMITS SECTION

PERMIT  
FOR THE STORAGE AND TREATMENT  
OF DANGEROUS WASTE

Washington State  
Department of Ecology  
P.O. Box 47600  
Olympia, Washington 98504-7600  
Telephone: (206) 459-6000

Issued in accordance with the applicable provisions of the Hazardous Waste Management Act, Chapter 70.105 RCW, and the regulations promulgated thereunder in Chapter 173-303 WAC.

ISSUED TO:

Burlington Environmental, Inc. and  
(Operator, Pier 91 Facility)  
2203 Airport Way So., Suite 400  
Seattle, Washington 98134  
Telephone: (206) 223-0500  
EPA ID No. WAD 000812#917

The Port of Seattle (Owner)  
P.O. Box 1209  
Pier 66  
Seattle, WA 98111  
Telephone: (206) 728-3000

This Permit is effective as of August 26, 1992 and shall remain in effect until August 26, 2002 unless revoked and reissued, modified, or terminated under WAC 173-303-830(3) and (5) or continued in accordance with WAC 173-303-806(7).

ISSUED BY: WASHINGTON DEPARTMENT OF ECOLOGY

Cindy J. Gilder  
Cindy J. Gilder, Section Head  
Hazardous Waste Permits  
Department of Ecology

Date 7-22-92

July 22, 1992

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INTRODUCTION

PERMITTEE: BURLINGTON ENVIRONMENTAL, INC.  
EPA/STATE IDENTIFICATION NUMBER: WAD000812917

Pursuant to:

Chapter 70.105 RCW, the Hazardous Waste Management Act of 1976, as amended, and regulations codified in Washington Administrative Code (WAC) 173-303.

A Permit is issued to Burlington Environmental, Inc. as operator (hereafter called the Permittee), and The Port of Seattle as owner, to operate a dangerous waste storage and treatment facility (Pier 91) located at 2001 W. Garfield St., Seattle, Washington at latitude 47 degrees 38 minutes 08 seconds North and longitude 122 degrees 22 minutes 50 seconds West.

The Permittee must comply with all terms and conditions set forth in this Permit and in Attachments AA through MM. When this Permit and the above attachments conflict, the wording of the Permit will prevail. The Permittee must also comply with all applicable state regulations, including Chapter 173-303 WAC (Attachment KK) and as specified in the Permit.

Applicable state and federal regulations are those which are in effect on the date of final administrative action on this Permit and any self implementing statutory provisions and related regulations which, according to the requirements of RCRA (as amended), or state law, are automatically applicable to the Permittee's dangerous waste management activities, notwithstanding the conditions of this Permit.

This Permit is based upon the administrative record, as required by WAC 173-303-840. The Permittee's failure in the application or during the Permit issuance process to fully disclose all relevant facts, or the Permittee's misrepresentation of any relevant facts at any time, shall be grounds for the termination or modification of this Permit and/or initiation of an enforcement action, including criminal proceedings. The Permittee must inform the Director of any deviation from permit conditions or changes from information provided in the Part B permit application. In particular, the Permittee shall inform the Director of any proposed changes that might affect the ability of the Permittee to comply with applicable regulations and permit conditions, or which may alter any of the conditions of the Permit in any way.

The Department shall enforce all conditions of this Permit for which the State of Washington is authorized and all conditions which are

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designated in this Permit as state requirements only. Any challenges of any permit condition that concern state requirements, (i.e., conditions of this Permit for which the State of Washington received final authorization or conditions which are designated in the Permit as state requirements only) shall be appealed to the Department in accordance with WAC 173-303-845. In the event that the Department does not maintain final authorization, the Environmental Protection Agency will enforce all permit conditions except those which are state-only requirements.

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LIST OF ATTACHMENTS

The following listed documents are hereby incorporated, in their entirety, by reference into this Permit. Some of the documents are excerpts from the Permittee's Dangerous Waste Permit Application (most recently amended April 1992). The Department has, as deemed necessary, modified specific language in the attachments. These modifications are described in the permit conditions (Parts I through VI), and thereby supersede the language of the attachment. These incorporated attachments are enforceable conditions of this Permit, as modified by the specific permit condition.

|               |  |
|---------------|--|
| Attachment AA | Description of the Final Status Operational Areas and General Provisions (Section B of the Permit Application)                         |
| Attachment BB | Part A Dangerous Waste Permit Application, to be effective upon issuance of the Permit (Section A of the Permit Application)           |
| Attachment CC | Waste Analysis Plan (Sections C2.0 through C.2.8.2, inclusive, and Appendices C-2 through C-4, inclusive, of the Permit Application)   |
| Attachment DD | Security Procedures and Equipment (Sections Fl.0 through Fl.2, inclusive, of the Permit Application)                                   |
| Attachment EE | Inspection Schedule (Sections F2.0 through F2.2.3, inclusive, and Appendices F-1 through F-8, inclusive, of the Permit Application)    |
| Attachment FF | Personnel Training Plan (Section H and Appendix H-1 of the Permit Application)   |
| Attachment GG | Contingency Plan (Section G and Appendices G-1 through G-4, inclusive, of the Permit Application)                                      |
| Attachment HH | Closure Plan (Section I and Appendices I-3 through I-6, inclusive, of the Permit Application)  |
| Attachment II | Dangerous Waste Tanks (Sections Dl.0 through Dl.8.2, inclusive, and Appendices D-1 through D-10, inclusive, of the Permit Application) |

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LIST OF ATTACHMENTS (CONTINUED)

|               |   |
|---------------|---|
| Attachment JJ | Preparedness and Prevention Measures (Sections F3.0 through F5.2, inclusive, of the Permit Application) |
| Attachment KK | Chapter 173-303 WAC (April 1991)  |
| Attachment LL | List of Analytes for the Pier 91 Part B Closure Plan  |
| Attachment MM | Description of the Permittee's Treatment and Storage Area   |



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DEFINITIONS

For purposes of this Permit, the following definitions shall apply:

- a. The term "Permit" shall mean the Permit issued by the Washington State Department of Ecology, pursuant to Chapter 70.105 RCW and Chapter 173-303 WAC.
- b. The term "Director" shall mean the Director of the Washington State Department of Ecology or a designated representative. The Section Head (with the address as specified on page one of this Permit) is a duly authorized and designated representative of the Director for purposes of this Permit.
- c. The term "Department" shall mean the Washington State Department of Ecology, (with the address as specified on page one of this Permit).
- d. The terms "facility" or "site" shall mean that property leased from the Port of Seattle by the Permittee as well as all contiguous property owned by the Port of Seattle, including structures, appurtenances, and improvements.
- e. The term "Permittee's treatment and storage area" shall mean that portion of the facility defined in Attachment MM.
- f. The term "new tank system" is defined to mean tank systems which have never been used for dangerous waste management at this site before, existing tanks planned for conversion to manage regulated waste, existing tanks being relocated under this Permit, and tanks out of active service for more than 1 year which are proposed for regulated waste usage.
- g. The term "release" shall mean any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment of any hazardous waste or hazardous constituents.
- h. All definitions contained in WAC 173-303-040 are hereby incorporated, in their entirety, by reference into this Permit. Any of the definitions used above, (a) through (g), shall supersede any definition of the same term given in WAC 173-303-040. Where terms are not defined in the regulations or the Permit, the meaning associated with such terms shall be defined by a standard dictionary reference or the generally accepted scientific or industrial meaning of the term.

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PART I - STANDARD CONDITIONS

I.A. EFFECT OF PERMIT

The Permittee is authorized to store and treat dangerous waste in accordance with the conditions of this Permit and in accordance with the applicable provisions of Chapter 173-303 WAC. Any storage or treatment of dangerous waste by the Permittee at this facility that is not authorized by this Permit or Chapter 173-303 WAC and for which a permit is required by Chapter 173-303 WAC, is prohibited. Issuance of this Permit does not convey any property rights of any sort or any exclusive privilege. Issuance of this Permit does not authorize any injury to persons or property or invasion of other private rights, or any infringement of state or local law or regulations.

I.B. GENERAL PERMIT CONDITIONS

I.B.1. The general permit conditions under WAC 173-303-810, final facility standards under WAC 173-303-600, and, when the Permittee is a generator, generator requirements under WAC 173-303-170, are incorporated by reference into this Permit and must be adhered to by the Permittee.

I.B.2. The list of attachments on Pages 5 and 6 are incorporated by reference into this Permit. The Permittee's operations must be in accordance to the contents of the attachments and this Permit.

I.C. PERMIT ACTIONS

I.C.1 This Permit may be modified, revoked and reissued, or terminated for cause, as specified in WAC 173-303-830(3). The filing of a request for a permit modification, revocation and reissuance, or termination, or the notification of planned changes or anticipated noncompliance on the part of the Permittee, does not stay the applicability or enforceability of any permit condition.

I.C.2. This Permit may be renewed as specified in WAC 173-303-810(3) and Permit Condition I.E.2. Review of any application for a Permit renewal shall consider improvements in the state of control and measurement technology, as well as changes in applicable regulations.



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I.C.3. Permit modification at the request of the Permittee will be done according to the three tiered modification system, WAC 173-303-830(4) and Department guidance documents. This includes any modification from design drawings to as-builts.

I.D. SEVERABILITY

I.D.1. The provisions of this Permit are severable, and if any provision of this Permit, or the application of any provision of this Permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this Permit shall not be affected thereby. Invalidation of any state or federal statutory or regulatory provision which forms the basis for any condition of this Permit does not affect the validity of any other state or federal statutory or regulatory basis for said condition.

I.D.2. In the event that a condition of this Permit is stayed for any reason, the Permittee shall continue to comply with the related applicable and relevant interim status standards in WAC 173-303-400 until final resolution of the stayed condition unless the Director determines compliance with the related applicable and relevant interim status standards would be technologically incompatible with compliance with other conditions of this Permit which have not been stayed.

I.E. DUTIES AND REQUIREMENTS

I.E.1. The Permittee shall comply with all conditions of this Permit, except to the extent and for the duration such noncompliance is authorized by an emergency Permit. Any Permit noncompliance, other than noncompliance authorized by an emergency Permit, constitutes a violation of Chapter 70.105 RCW and is grounds for revocation and reissuance, or modification; or for denial of a Permit renewal application.

I.E.2. If the Permittee wishes to continue an activity allowed by this Permit after the expiration date of this Permit, the Permittee shall submit a complete application for a Permit at least 180 days prior to Permit expiration.

I.E.3. It shall not be defense for the Permittee, in an enforcement action that it would have been necessary, to halt or reduce the Permitted activity in order to maintain compliance with the conditions of this Permit.

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- I.E.4. In the event of noncompliance with this Permit, the Permittee shall take all reasonable steps to minimize releases to the environment and shall carry out such measures, as are reasonable, to prevent significant adverse impacts on human health or the environment.
- I.E.5. The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this Permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance/quality control procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this Permit.
- I.E.6. The Permittee shall furnish to the Director, within a reasonable time, any relevant information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or termination this Permit, or to determine compliance with this Permit. The Permittee shall also furnish to the Director, upon request, copies of records required to be kept by this Permit.
- I.E.7. Pursuant to WAC 173-303-810(10), the Permittee shall allow the Director, or authorized representatives, upon the presentation of credentials and other documents as may be required by law, to:
- a. Enter at reasonable times upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this Permit;
  - b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Permit;



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- c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit; and
- d. Sample or monitor, at reasonable times, for the purposes of assuring Permit compliance or as otherwise authorized by Chapter 70.105 RCW, any substances or parameters at any location.

I.E.8. The Permittee may not commence treatment or storage of dangerous waste in any new or modified portion of the facility until the Permittee has submitted to the Director, by certified mail or hand delivery, a letter signed by the Permittee and a registered professional engineer stating that the facility has been constructed or modified in compliance with the Permit; and

- a. The Director, or his authorized representative, has inspected the modified or newly constructed facility and finds it is in compliance with the conditions of the Permit; or
- b. The Director has either waived the inspection or has not within 15 days notified the Permittee of his intent to inspect.

I.E.9. Whenever the Permittee becomes aware that it failed to submit any relevant facts in the Permit application, or submitted incorrect information in a Permit application or in any report to the Director, the Permittee shall promptly submit such facts or information.

I.F. MONITORING AND RECORDS

I.F.1. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The method used to obtain a representative sample of the waste to be analyzed must be the appropriate method from WAC 173-303-110 or an equivalent method approved by the Director. Laboratory methods must be those specified in WAC 173-303-110(3)(a) or an equivalent method as specified in Attachment CC.

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I.F.2. Pursuant to WAC 173-303-810(11), records of monitoring information shall specify:

- a. The dates, exact place, and times of sampling or measurements;
- b. The individuals who performed the sampling or measurements;
- c. The dates analyses were performed;
- e. The individuals who performed the analyses;
- f. The analytical techniques or methods used; and
- g. The results of such analyses.

I.G. COMPLIANCE NOT CONSTITUTING DEFENSE

Compliance with the terms of this Permit does not constitute a defense to any order issued or any action brought under any state law governing protection of public health or the environment.

I.H. TRANSFER OF PERMITS

This Permit is not transferable to any person, except after notice to the Director. The Director may require modification or revocation and reissuance of the Permit pursuant to WAC 173-303-830(2). Before transferring ownership or operation of any portion of the Permittee's treatment and storage area prior to final closure of that area, the Permittee shall notify the new owner or operator in writing of the requirements of this Permit.

I.I. PERMIT EXPIRATION AND CONTINUATION

This Permit and all conditions herein will remain in effect beyond the Permit's expiration date until final permit determination if the Permittee has submitted a timely, complete application (under WAC 173-303-806), and, through no fault of the Permittee, the Director has not made a final permit determination as set forth in WAC 173-303-840. This Permit may be modified or revoked and reissued as necessary, in accordance with WAC 173-303-830(3).

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I.J. REPORTS, NOTIFICATIONS AND SUBMISSIONS

All reports, notifications or other submissions which are required by this Permit to be sent or given to the Director should be sent certified mail or given to:

Supervisor, Hazardous Waste Section  
Department of Ecology  
Northwest Regional Office  
3190 160th Ave S.E.  
Bellevue, Washington 98008-5452  
Telephone: (206) 649-7000

This phone number and address may change.

I.K. CONFIDENTIAL INFORMATION

Any information submitted by the Permittee to the Director may be claimed as confidential by the Permittee in accordance with applicable provisions of WAC 173-303-830(15).

I.L. DOCUMENTS TO BE MAINTAINED AT FACILITY SITE

Current copies of the following documents, as amended, revised, and modified, shall be maintained at the facility. Where noted in this Permit, documentation at the facility may be made by reference to records at the Burlington Environmental corporate office, which is located at 2203 Airport Way South, Seattle, WA. These documents must be maintained until closure is complete and certified by an independent, registered professional engineer, unless a lesser time is specified in the Permit.

1. The Permit and all Attachments;
2. The Part B Permit application; and
3. The facility operating record.



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## PART II - GENERAL CONDITIONS

### II.A. GENERAL WASTE MANAGEMENT

- II.A.1. The Permittee is authorized to receive the dangerous waste specified in Attachment BB from sources off-site, except that the Permittee may not accept ignitable wastes with a flash point of less than 100°F. Dangerous wastes shall only be received from regulated generators with a valid State/EPA identification number, conditionally exempt small quantity generators, and legitimate household waste generators. In specific emergency situations, the Permittee may also accept dangerous wastes generated by regulated generators without a State/EPA identification number. Such emergency acceptance shall require prior written authorization, which may be via telecommunications (i.e., facsimile), from the Department. These wastes shall be managed only under the conditions of this Permit.
- II.A.2. The Permittee must inform the generator in writing that he has the appropriate permits for and will accept the dangerous waste the generator is shipping as required by WAC 173-303-290(3). The Permittee must keep a copy of this written notice as part of the operating record (this may be by reference to records at the corporate office) until final closure of the facility is complete and certified.
- II.A.3. The Permittee shall notify the Director in writing at least four weeks in advance of the date the Permittee expects to receive dangerous waste from a foreign source, as required by WAC 173-303-290(1). Notice of subsequent shipments of the same waste from the same foreign source in the same calendar year is not required.
- II.A.4. New test methods shall be used immediately upon the effective date of the State laws or regulations which mandate the use of the test methods.
- II.A.5. Dangerous waste brought on-site cannot leave the unloading area until the manifest number has been recorded on logging and tracking forms.



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II.A.6. Each regulated generator's dangerous waste stream which is received by the Permittee more than twice a year shall undergo annual full characterization. Full characterization is defined as completing a waste profile sheet which shall identify the dangerous constituents and characteristics necessary for proper designation and management of the waste stream, along with accounting for 100% of the material (e.g., 30% oil, 70% water).

a. Except as specified in b. below, full characterization shall include or consist of:

- i. Existing published or documented data on the dangerous waste or on waste generated from similar processes. The use of existing published or documented data shall include confirmation by the generator that the process generating the dangerous waste has not significantly changed; or
- ii. Laboratory analysis of the waste stream consisting of chemical, physical, and/or biological analyses using methods which are accepted by the Department. Analysis shall be performed by a laboratory accredited by Washington State under Chapter 173-50 WAC. Wastes shall be analyzed for all hazardous constituents except those which can be demonstrated not to be present in any of that generator's waste streams, or those which do not change the proper designation and management of the waste stream.

b. In the following circumstances a waste stream shall undergo full characterization consisting solely of laboratory analyses meeting the requirements of II.A.6.a.ii. above, and knowledge as necessary to designate a waste under WAC 173-303-080, Dangerous Waste Lists. Such characterization shall occur prior to receipt of the next shipment of that waste stream.

- i. The Permittee has been notified, or has reason to believe, that the process or operation generating the dangerous waste has significantly changed;

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- ii. There is a discrepancy between a generator's waste designation, as provided by the generator's waste profile and the Permittee's waste designation, as determined by the screening analysis and any further waste analysis;
- iii. The first time a waste undergoes full characterization. This shall include but not be limited to all waste streams for which waste profiles are amended, such as pursuant to Permit Condition II.A.16.a.i.; and
- iv. No more than five years from the last full characterization by laboratory analysis.

II.A.7. Dangerous wastes with values below 5,000 Btu/lb as generated, both received from off-site and generated on-site, shall not be incorporated into dangerous waste fuels. This requirement is consistent with the guidance regarding legitimate recycling of low-Btu wastes, as stated in the March 16, 1983 Federal Register (48FR11157) and subsequent federal updates.

- a. Dangerous wastes are exempt from the requirements of this permit condition if:
  - i. They are received from conditionally exempt small quantity generators;
  - ii. It can be demonstrated that the dangerous waste is burned solely as an ingredient; or
  - iii. The final destination of the dangerous waste fuel is an industrial boiler or furnace that has achieved certification of compliance with final permit standards or interim emission standards under 40 CFR 266.102 or 266.103.
- b. Phase separation of wastes constitutes treatment. The outputs of such treatment are thus wastes generated on-site and subject to the requirements of this condition.



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- II.A.8. For all dangerous wastes which are subject to the 5,000 Btu/lb minimum requirement of Permit Condition II.A.7. and which are mixed with different waste streams and/or wastes from different generators for the purpose of bulk transport to the facility, the Permittee shall obtain representative samples of the waste, as generated, prior to bulking. Such samples shall be subject to all appropriate analyses pursuant to Attachment CC and Permit Condition II.A.10. The Permittee is not required to sample wastes prior to bulking by the generator.
- II.A.9. For all dangerous wastes which are subject to the 5,000 Btu/lb minimum requirement of Permit Condition II.A.7. and which are generated on-site, the Permittee shall obtain representative samples. Such samples shall be subject to analysis requirements of Permit Condition II.A.10.
- II.A.10. For all materials listed under a. below that are also subject to Permit Condition II.A.7., the Permittee shall determine the Btu value. Except as noted in b. below, the Permittee shall determine the Btu value of representative samples using Method D-2105 of the 1986 Annual Book of ASTM Standards.
- a. Materials subject to the requirements of this permit condition shall be:
    - i. All incoming bulk shipments of dangerous waste;
    - ii. All dangerous waste generated on-site; and
    - iii. All dangerous waste sampled pursuant to Permit Condition II.A.8.
  - b. The Permittee shall not be required to determine the Btu value of waste samples using method D-2105 under the following circumstances:
    - i. The Permittee can demonstrate that the waste stream is an unused commercial product with a known heat content above 5,000 Btu/lb; or

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- ii. The Permittee can demonstrate:
  - A. The waste is a mixture of which all components are known; and
  - B. Existing published or documented data shows that all components of the waste have a known heat content greater than 5,000 Btu/lb; or
- iii. The most recent waste profile of the waste stream indicates a value of at least 7500 Btu/lb, and the waste received matches the profile.
  - A. For the purposes of this condition, in order to demonstrate that a waste matches the profile, the following tests as described in Attachment CC shall always be performed:
    - I. Physical description;
    - II. Ignitability screen;
    - III. Specific gravity (Density); and
    - IV. Chlorinated solvent screen.
  - B. Should the results of any of the tests required in A. above disagree with the waste profile, the discrepancy must be rectified pursuant to Permit Condition II.A.16. and the Permittee shall determine the Btu value of the waste using method D-2105 prior to incorporating it into dangerous waste fuel.

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- II.A.11. Each incoming shipment of dangerous waste from off-site facilities shall be sampled and in addition to all appropriate primary and secondary analyses in accordance with Attachment CC, the following tests shall always be performed on aqueous (water) phases:

| Test Parameter   | Test Method  |
|--|--|
| a. pH  | pH Analysis defined in Attachment CC               |
| b. Cyanide,<br>If pH >6                                      | Cyanide Spot Test defined in Attachment CC         |
| c. Reactive Sulfide,<br>If pH >7 and<br>negative for cyanide | Test for Reactive Sulfide defined in Attachment CC |

- II.A.12. Each incoming shipment of dangerous waste from off-site facilities shall be sampled and in addition to all appropriate primary and secondary analyses in accordance with Attachment CC, the PCB Analysis, as defined in Attachment CC, shall always be performed on non-aqueous phases.

- II.A.13. The Permittee must use the Toxicity Characteristic Leaching Procedure (TCLP) or use knowledge of the waste to determine whether a waste exhibits the characteristic of toxicity, as defined in WAC 173-303-090(8).



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II.A.14. When there is a discrepancy between a Generator's dangerous waste designation, as provided by the generator profile or the manifest description, and the Permittee's dangerous waste designation, as determined by the screening analysis and any further waste analysis, the following steps shall be taken:

- a. The generator shall be informed of the discrepancy and given the following options:
  - i. Amend the current profile or manifest, or submit a new profile which properly represents the waste; or
  - ii. Provide the Permittee permission to transport the load back to the generator (if also a TSD) or to an alternative permitted TSD facility.
- b. A significant manifest discrepancy shall be resolved within 15 days after receipt of the waste. If a longer period is required the Permittee shall notify the Department in a letter describing the discrepancy and attempts to reconcile it. Such notice shall include a copy of the manifest or shipping paper at issue.

II.A.15. Rinsate generated from the management of listed dangerous waste, such as from tank cleaning, shall be managed as dangerous waste in accordance with the Attachment II.

II.A.16. All analyses performed in order to determine whether a waste exhibits the characteristic of ignitability or has a flash point which is acceptable for receipt at the facility shall be done with the most recent methods in SW-846. Currently those methods are Method 1010: the Pensky-Martens Closed Cup Method for Determining Ignitability and Method 1020: The Setaflash Closed Cup Method for Determining Ignitability.

II.B. PREPAREDNESS AND PREVENTION

II.B.1. The Permittee shall ensure all water related safety equipment such as eyewash units and emergency showers shall remain operable at all times, including during periods of subfreezing temperatures.



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II.B.2. In accordance with WAC 173-303-340 the facility shall be designed, constructed, maintained, and operated to minimize the possibility of fire, explosion, or any unplanned sudden or non-sudden release of dangerous waste or dangerous waste constituents to air, soil, or surface or ground water which could threaten human health or the environment.

II.B.3. A Permittee employee shall observe all loading and unloading of dangerous waste to or from tanker trucks occurring within the Permittee's treatment and storage area.

II.C. RECORDKEEPING AND REPORTING

II.C.1. Operating Record: The Permittee shall maintain a written operating record at the facility, consisting of records kept for the length of time specified below. The record can be a compilation of various documents and when specifically noted may be by reference to records maintained at the corporate office, located at 2203 Airport Way South, Seattle, WA. The Permittee shall also record all information referenced in this Permit in the operating record within 48 hours of the information becoming available. The operating record shall include, but not be limited to, the information listed below.

- a. The following records shall be maintained until closure and corrective action are complete and certified:
  - i. A current map showing the location of dangerous waste management units and non-regulated units within the facility;
  - ii. A map showing all locations of past dangerous waste management units if different from present locations;
  - iii. Assessment reports, as per WAC 173-303-360(2)(k), of all incidents that require implementation of the contingency plan (may be by reference to records at the corporate office);
  - iv. Record of spills and releases (may be by reference to records at the corporate office);

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- v. Written reports and records of verbal notification to the Director to address releases, fires, and explosions (may be by reference to records at the corporate office);
- vi. Summaries of all records of corrective action;
- vii. All other environmental permits (current copies shall be maintained at the facility, past copies may be by reference to records at the corporate office);
- viii. Corrective action deed notification (may be by reference to records at the corporate office);
- ix. The following information, as it relates to the waste analysis plan;
  - A. The date(s), exact place, and times of sampling or measurements;
  - B. The name of the individual(s) who performed the sampling or measurements;
  - C. The date(s) analyses were performed, demonstrating that EPA SW-846 holding times were satisfied;
  - D. The name of the individual(s) who performed the analyses;
  - E. The analytical techniques or method used (may be by reference to records at the corporate office);
  - F. The analytical results;
  - G. The QA/QC summary (may be by reference to records at the corporate office); and
  - H. The type and model # of the equipment used for analysis (may be by reference to records at the corporate office).
- x. Training records of current Permittee facility personnel;
- xi. Facility construction records pursuant to Permit Condition IV.B.2. (may be by reference to records at the corporate office).

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- b. The following records shall be maintained for a minimum of 5 years. This time period may be extended by the Department in the event of enforcement action or notification by the Department that an investigation is ongoing. In the case of notification of investigation, the Permittee will not be required to keep the records longer than one (1) year past the normal time frame unless an enforcement action is issued:
  - i. Facility operation and maintenance records and reports prepared pursuant to this Permit;
  - ii. Date(s) and method(s) of treatment used per dangerous waste process operation including name(s) of personnel performing actual operation;
  - iii. Progress reports and any required notifications prepared pursuant to this Permit (may be by reference to records at the corporate office);
  - iv. Records of all inspection and monitoring information, including all calibration and maintenance records which shall include at a minimum:
    - A. The date and time of data recording;
    - B. The name of the person taking and recording the information; and
    - C. The recorded information itself whether consisting of observation, data measurement, instrument reading or any other monitoring method.
  - v. Annual reports submitted in compliance with WAC 173-303-220(1), Generator Report - Form 4 unless the reports are necessary to supplement information required by a. above, in which case they must be retained until facility closure and corrective action are complete and certified. (may be by reference to records at the corporate office).
- c. The following records shall be maintained for a minimum of 3 years. This time period may be extended by the Department in the event of enforcement action or notification by the Department that an



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investigation is ongoing. In the case of notification of investigation, the Permittee will not be required to keep the records longer than one (1) year past the normal time frame unless an enforcement action is issued:

- i. The records of all inspections and analyses required by Permit Condition IV.A.3.b.;
  - ii. Manifests and any required unmanifested shipment or exception reports;
  - iii. Training records of former Permittee facility personnel; and
  - iv. Annual reports submitted in compliance with WAC 173-303-390(2), TSD Facility Report - Form 5, unless the reports are necessary to supplement information required by a. above, in which case they must be retained until facility closure and corrective action are complete and certified. (may be by reference to records at the corporate office).
- d. Current copies of the following documents as amended, revised, and modified shall be maintained at the facility until closure and corrective action are complete and certified:
- i. Contingency Plan;
  - ii. Training Plan;
  - iii. Waste Analysis Plan;
  - iv. Documentation of arrangements made with local authorities pursuant to WAC 173-303-340;
  - v. All closure, interim measures and final corrective action cost estimates, financial assurance documents prepared pursuant to this Permit, as well as the company names and addresses of Permittee insurers;
  - vi. Closure Plan;
  - vii. For all new and converted "new" tank systems, pursuant to WAC 173-303-640(3):

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- A. An assessment, by an independent, registered professional engineer or independent qualified tank installation inspector not affiliated with the tank vendor, certified by an independent, registered professional engineer, that the tank system was installed properly and that all discrepancies have been repaired;
- B. Results of tightness testing and integrity assessments; and
- C. For all tanks which require corrosion protection, a written statement from a corrosion expert that attests to the proper design and installation of any corrosion protection measures.

viii. The results of periodic tightness testing and integrity assessments of all tank systems; and

ix. The results of tightness testing of the interspace area between tank bottoms pursuant to Permit Condition IV.A.3.d.

II.C.2. The Permittee shall submit waste analysis or monitoring data within eight (8) weeks of receipt of a written request by the Department. If, by the end of the eight (8) week period, the requested data have not undergone Quality Assurance/Quality Control (QA/QC), and if the Department requests it, the Permittee shall submit the requested data in raw form. The Permittee shall identify all data submitted which has not undergone QA/QC.

II.D. CLOSURE

II.D.1. The Permittee shall submit a proposed background sampling plan to the Department at least eight (8) weeks in advance of the scheduled collection of background samples. The plan shall include a map showing the proposed sampling locations. The Department will have eight (8) weeks, from the date the Department receives the proposed background locations, to accept or deny the sampling proposal. Failure to respond within eight (8) weeks will constitute acceptance.

II.D.2. The Permittee shall notify the Department at least 10 working days in advance of the scheduled collection of background samples.

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- II.D.3. Analysis of background samples for constituents which are also specified for analysis in closure samples shall be performed by the methods indicated for closure samples in Attachments HH and LL.
- II.D.4. The background analysis shall be statistically defensible considering local area conditions (e.g., soil heterogeneity, etc.). This shall require at a minimum:
- a. A sufficient number of samples to provide a representative measure of background levels for hazardous constituents and substances; and
  - b. The exclusion of outliers to the distribution of background samples from any determination of background environmental levels of hazardous constituents and substances.
- II.D.5. The Permittee may perform additional background sampling or analysis. A proposal for additional sampling or analysis must be submitted and approved in accordance with Permit Condition II.D.1. and must meet the requirements of Permit Conditions II.D.2. and II.D.3.
- II.D.6. If the Department determines that implementation of the approved background sampling plan has not adequately or accurately quantified background conditions, the Department may issue a final decision requiring additional sampling and analysis. The issuance of such a decision shall constitute an Agency action subject to the rights of appeal under Chapter 34.05 RCW.



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II.D.7. Clean closure shall require the removal of all hazardous constituents listed in WAC 173-303-9905.

- a. Removal to demonstrate clean closure shall mean attaining background environmental levels.
  - i. For the purposes of this permit condition, "background environmental level" shall mean the concentration of a hazardous substance determined by approved laboratory and statistical analyses of samples collected pursuant to Permit Condition II.D.1.
  - ii. If background environmental levels cannot be quantified for a hazardous constituent or substance, the practical quantitation limit (PQL) of the closure sample will be the standard.
- b. For hazardous constituents derived from waste or waste residues specified in WAC 173-303-610(2)(b)(ii) (state only wastes), removal shall also assure the hazardous constituents are below the waste designation limits and the appropriate cleanup standards of Chapter 173-340 WAC.
- c. The Department must approve of analytical and statistical methods used to determine whether soil samples from dangerous waste management areas demonstrate compliance with the standards for clean closure.

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II.D.8. Sampling and analysis at the time of closure shall be conducted in accordance with the closure plan in Attachments HH and LL. The Department may require modification of the closure plan should the facility begin receiving different dangerous wastes (i.e., wastes requiring different management practices or changes to the Part A Permit) or if additional significant releases occur at the facility prior to the time of closure.

- a. Within four (4) weeks of Notification of Closure pursuant to WAC 173-303-610(3)(c)(i) the Permittee shall submit to the Department a sampling plan. At a minimum the sampling plan shall identify the location of all soil and concrete samples to be taken. The sampling plan shall specify no less than the number of samples indicated in attachment HH and Permit Conditions II.D.8.c. and II.D.8.d. The methods of selecting random and biased sampling locations shall be consistent with those indicated in attachment HH. The Department will have eight (8) weeks from the date that the plan is received to require modification to the plan, or to approve the plan with or without changes. Failure to respond within eight (8) weeks will constitute approval of the plan.
- b. After the Notification of Closure pursuant to WAC 173-303-610(3)(c)(i) and at the request of the Department the Permittee shall provide the Department with the results of all previous analyses of soil or concrete samples from the treatment and storage area.
- c. The Permittee shall take biased soil samples from beneath locations of all stains and cracks in the concrete. Such samples shall be analyzed as biased soil samples pursuant to Attachments HH and LL. For the purposes of the financial assurance requirements of Permit Condition II.F.1. the Permittee shall assume closure soil sampling and analysis will require at a minimum:
  - i. Five (5) biased samples beneath cracks or stains;
  - ii. 16 biased samples beneath sumps; and
  - iii. 39 random samples.

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- d. If concrete from containment areas is to be left on-site or disposed of in a sanitary landfill, then the Permittee shall take biased samples of the concrete at locations of all cracks and stains. Such samples shall be analyzed as biased concrete samples pursuant to Attachments HH and LL.
- e. The Permittee shall use approved analytical methods that achieve quantification limits adequate for demonstrating compliance with closure standards defined in Permit Condition II.D.7. To ensure this, the Department may issue a final decision requiring specialized sample collection or analysis techniques. The issuance of such a decision shall constitute an Agency action subject to the rights of appeal under Chapter 34.05 RCW.

II.D.9. All piping in the Permittee's treatment and storage area which may have contained dangerous waste including piping under the surface of the secondary containment shall be disposed of in a RCRA permitted hazardous waste disposal facility or decontaminated in accordance with the procedures and standards for tanks and piping in the closure plan, Attachment HH.

II.D.10. The following are specific laboratory procedures to be followed during closure:

- a. When using GC/MS, peaks shall be identified as "Tentatively Identified Compounds" (TICs) if they are greater than 10% of the nearest internal standard response. If possible, up to 10 TICs shall be reported for each volatile organic analysis (VOA) and up to 20 TICs shall be reported for each semi-VOA. The Department may, with reason, require the identification of additional peaks. If a priority pollutant is discovered it shall be quantified.
- b. When AA or ICP is utilized, cold vapor atomic absorption, or the most recent SW-846 method for low level mercury detection, shall be used for mercury analysis.
- c. Metal analysis shall use SW-846 Method 3050, or EPA method 200.2, or the most recent SW-846 digestion techniques for sample preparation for metals to be analyzed by flame AA or ICP.

II.D.11. The activities of the independent registered engineer to assure that closure is conducted in accordance with the



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approved plan shall specifically include, but not be limited to, the following:

- a. Observation of all pre-designated locations to be biased sampled;
- b. The observation of the collection of background samples;
- c. Review of tank decontamination records to determine that closure plan requirements for triple rinsing and rinsate management have been followed and that tanks have been adequately cleaned;
- d. Determining compliance with sampling protocols; and
- e. Review of laboratory results before discharge of decontaminated rinsate.

II.D.12. Should a corrective measures workplan approved by the Environmental Protection Agency indicate that soil and/or concrete removal is required and should such removal be deferred until facility closure, the Permittee shall revise the facility closure plan. Such a revision shall not be subject to the permit modification requirements of Permit Condition I.C.3.

- a. The Permittee shall submit to the Department within eight (8) weeks of final approval of the workplan:
  - i. A revised closure plan and closure cost estimate incorporating the requirements of the workplan; and
  - ii. Revised financial assurance documentation based on the closure cost estimate prepared pursuant to i. above.
- b. The Department will have eight (8) weeks from the date that the submittals pursuant to a. above are received to require modification to the submittals, or to approve the submittals with or without changes. Failure to respond within eight (8) weeks will constitute approval of the submittals.

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II.E. CLEAN UP OF RELEASED MATERIAL

- II.E.1. In the event of a spill or nonpermitted discharge of dangerous waste the Permittee shall comply with the requirements of WAC 173-303-145. In addition to the requirements of WAC 173-303-145, the Permittee shall:
- a. Take appropriate immediate action to protect human health and the environment; and
  - b. Clean up all released dangerous waste or hazardous substances. At a minimum the Department will require such clean ups to attain the facility closure standards.
- II.E.2. Any spilled or leaked dangerous waste within secondary containment shall be removed immediately upon identification.

II.F. FINANCIAL ASSURANCE AND LIABILITY REQUIREMENTS

- II.F.1. The Permittee shall demonstrate continuous compliance with WAC 173-303-620(4) by providing documentation of financial assurance to the Director as required by WAC 173-303-620(10).
- a. Such documentation shall be adjusted annually for inflation in compliance with WAC 173-303-620(3)(c) and entered into the facility operating record per WAC 173-303-620(3)(d) and Permit Condition II.C.2.c.v. Annual adjustment for inflation shall not require a permit modification under WAC 173-303-830.
    - i. Financial assurance, prior to future adjustment for inflation, shall be in at least the amount of the closure cost estimate in Attachment HH as revised by the requirements of Permit Condition II.F.3.
    - ii. The pay-in period of a trust fund shall not exceed the term of the Permit.
  - b. The Permittee shall provide documentation of financial assurance adequate for disposal or treatment of the contents and subsequent decontamination of any new dangerous waste management tank, no later than 60 days prior to the use of such tank.
- II.F.2. The Permittee shall report to the Director any claims made on the liability insurance fund. The report shall be

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submitted in writing within 30 days of the filing of such claims and shall contain information on the number and type of claims filed, the amount of each claim, and a description of the occurrence that led to the claim.

- II.F.3. The Permittee shall submit to the Department, no less than 90 days after the Permit effective date, a revised closure cost estimate and financial assurance based upon the requirements of this Permit, including but not be limited to the requirements of Permit Conditions II.D.8.

II.G. AIR EMISSION STANDARDS

- II.G.1. The Permittee shall comply with requirements of the Puget Sound Air Pollution Control Agency (PSAPCA). These requirements include but are not limited to the following:
- a. Annual registration including an air emissions inventory to provide a description of existing treatment processes and units which are or could potentially be a source of air emissions.
  - b. Submittal of a Notice of Construction for proposed waste management processes and associated waste management units which could potentially be a source of air emissions.



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### PART III - TANK SYSTEMS

#### III.A. EXISTING DANGEROUS WASTE TANK SYSTEMS

III.A.1. The Permittee may store and/or treat dangerous wastes in the following tanks:

2307 through 2310, 2313, and 2701 through 2710.

#### III.B. INTEGRITY ASSESSMENT

III.B.1 The Permittee shall review, pursuant to WAC 173-303-640(2)(c) and based on current tank integrity assessment results, the structural integrity of all dangerous waste management tank systems every five years starting from the date of Permit issuance or, for new tanks, starting from the date new tanks are put into dangerous waste service. See Table III-1 for more frequent interval inspections of the tank interior. Results of the integrity assessments shall be included in the Operating Record accessible at the facility. Any tank system found to be leaking or unfit for service must be immediately removed from service and the Permittee shall comply with the requirements of WAC 173-303-640(7). A tank system shall not be returned to service until the Permittee has obtained the required certification.

III.B.2. The tank integrity assessments performed every 5 years shall be done by an independent, registered, professional engineer. The initial assessment of new and converted "new" tank systems may be performed by an independent, qualified registered professional engineer, or by an independent qualified installation inspector not affiliated with the tank vendor, and shall be certified by an independent, qualified registered professional engineer.

III.B.3. Visual inspections referred to in Table III-1 must be done by an independent registered professional engineer or an independent National Association of Corrosion Engineers (NACE) Level II or Level III certified inspector at least once during each 5 year period. More frequent visual inspections called for in Table III-1 can be done by a Permittee employee who is a registered engineer or a NACE Level II or Level III certified inspector.

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III.C. TANK MANAGEMENT PRACTICES

- III.C.1. Unless the requirements of WAC 173-303-395(1)(b) are met, the Permittee shall not place dangerous waste into a tank system that has not been decontaminated and which was previously used for the management of incompatible wastes.
- III.C.2. Tank entry shall not be done until vapors, if present, are below 10 % of the Lower Explosive Limit (LEL).
- III.C.3. The integrity of the coating or lining required for containment systems by WAC 173-303-640 (4)(e)(ii)(D) shall be maintained.
- a. The coating or lining must seal the containment surface such that no cracks, seams, or other avenues through which liquid could migrate are present.
  - b. The coating or lining must be of adequate thickness or strength such that the normal operation of equipment and personnel within the given area will not immediately degrade or physically damage the coating or lining.
  - c. The coating or lining must be compatible with the waste stored in the containment system as specified in Attachment II.
- III.C.4. All construction joints in containment slabs in which water stops were not installed internal to the joint shall be inspected daily. Such inspections shall check for joint integrity, adhesion of sealants, cracks, gaps, and any other signs of deterioration. Results of the inspections shall be entered into the facility operating record.
- III.C.5. The integrity of all containment systems shall be maintained. Cracks, gaps, loss of integrity, deterioration, corrosion, or erosion of pads, berms curbs, sumps, construction joints, and coatings of storage and treatment areas shall be repaired. Repairs shall be completed within the week following detection of their need in accordance with Attachment EE (i.e., as a Priority 1 or Priority 2 response level repair or remedial action depending on the potential for an environmental release). All sumps shall be lined in accordance with specifications in Attachment II.

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III.D.        CLOSURE

III.D.1.      When hydroblasting is used as a method for tank decontamination during closure, hydroblasting procedures shall follow the guidelines specified by the Department. At the time of Permit issuance, current guidelines are contained in EPA document 600/2-85/028: "Guide for Decontaminating Buildings, Structures and Equipment at Superfund Sites.



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Table III-1.

TANK INTEGRITY ASSESSMENT SCHEDULE

| <u>Rating</u> | <u>Construction<br/>Material</u>                     | <u>Inspection<br/>Method</u>          | <u>Inspection Frequency</u>   |                                 |
|---------------|--|---------------------------------------|-------------------------------|---------------------------------|
|               |  |                                       | <u>Storage<br/>Processing</u> | <u>Corrosive<br/>Processing</u> |
| A             | Carbon or Stainless<br>Steel, uncoated or<br>unlined | Ultrasonic<br>Interior Visual         | 1 year<br>1 year              |                                 |
| A             | Carbon or Stainless<br>Steel, coated or lined        | Corrosion Coupon<br>Interior Visual   | 1 year<br>2 years             |                                 |
| A             | Polyethylene,  | Interior Visual                       | 1 year                        | 1 year                          |
| A             | Fiberglass   | Acoustic Emissions<br>Interior Visual | 2 years<br>2 years            |                                 |
| B             | Carbon or Stainless<br>Steel, uncoated<br>or unlined | Ultrasonic<br>Interior Visual         | 2 years<br>2 years            |                                 |
| B             | Carbon or Stainless<br>Steel, coated or lined        | Corrosion Coupon<br>Interior Visual   | 1 year<br>4 years             |                                 |
| B             | Polyethylene,  | Interior Visual                       | 2 years                       | 1 year                          |
| B             | Fiberglass   | Acoustic Emissions<br>Interior Visual | 2 years<br>2 years            |                                 |
| C             | Carbon or Stainless<br>Steel, uncoated or<br>unlined | Ultrasonic<br>Interior Visual         | 3 years<br>3 years            |                                 |
| C             | Carbon or Stainless<br>Steel, coated or lined        | Corrosion Coupon<br>Interior Visual   | 1 year<br>4 years             |                                 |
| C             | Polyethylene,  | Interior Visual                       | 2 years                       | 1 year                          |
| C             | Fiberglass   | Acoustic Emissions<br>Interior Visual | 2 years<br>2 years            |                                 |

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Key for Table III-1.

1. Rating "A" tanks provide lethal and highly toxic service posing the most severe risk in the event of a failure.
2. Rating "B" tanks pose a moderate to high risk from a tank failure.
3. Rating "C" poses a low to moderate hazard in the event of tank failure.

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#### PART IV - COMPLIANCE REQUIREMENTS

##### IV.A. TANK COMPLIANCE REQUIREMENTS

- IV.A.1. For all tanks which undergo modification, permit modification procedures, pursuant to Permit Condition I.C.3., will be followed. Emergency modifications to correct unsafe conditions may be performed prior to a formal modification request, but such a written request must be submitted within 30 days after the start of modification. The Permittee shall notify the Department, via telephone, within 24 hours of any emergency modifications.
- IV.A.2. The Permittee shall vent through activated carbon canisters or catalytic oxidation units all tanks storing material contaminated with organics which could emit toxic vapors during tank filling or because of tank breathing. The Permittee shall use the best demonstrated available technology consistent with primary safety concerns (e.g., risk of fire or explosion) to capture vapors, generated as the result of a fire, which cannot be captured by the carbon canisters or catalytic oxidation units.
- IV.A.3. The Permittee shall assure that the leak detection systems for tanks 2701, 2703, and 2705-2708 are capable of collecting and detecting any leaked material. Such assurance shall require that, at a minimum:
- a. The Permittee shall provide a means of detecting any liquid which may be present at the lowest point of the interspace area between the tank bottoms. Within eight (8) weeks of the Permit effective date the Permittee shall submit to the Department a determination, certified by an independent registered professional engineer, of the location of the lowest point of the interspace area between the tank bottoms and plans for appropriate leak detection systems. The Department shall have eight (8) weeks from the date the determination and plans are received to accept or deny the submittal. Failure to respond within eight (8) weeks will constitute acceptance.
    - i. If the determination of Permit Condition IV.A.3.a. indicates the bottom of the interspace area between the tank bottoms is flat or convex (i.e., the middle is higher than the perimeter) detection at the lowest point shall require detection at no less than six points evenly distributed about the perimeter of the tank.



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- ii. If the determination of Permit Condition IV.A.3.a.i. indicates the bottom of the interspace area between the tank bottoms is concave (i.e., the middle is lower than the perimeter) detection must be at the true lowest point.
- b. The Permittee shall inspect the leak detection system for evidence of accumulated liquids no less frequently than every 24 hours.
  - i. Inspections shall be in performed in accordance with an inspection plan approved in accordance with Permit Condition IV.A.3.c.
  - ii. Any liquid detected in the interspace area between the tank bottoms shall be promptly removed and appropriately treated or disposed.
  - iii. If any liquid detected in the interspace area between the tank bottoms is determined to be leaked material, the tank shall be immediately taken out of service, all contents shall be removed within 24 hours, and the tank shall not be returned to service until repaired and certified pursuant to Permit Conditions III.B.1. and IV.A.5.
- c. The Permittee shall submit to the Department within eight (8) weeks of the Permit effective date a revised inspection plan which includes the methodology for inspecting the leak detection system for the presence of accumulated liquid. The Department will have eight (8) weeks from the date the proposed methodology is received to either accept or deny the proposal. Failure to respond within (8) weeks shall constitute acceptance. The inspection plan shall assure, at a minimum:
  - i. The inspection procedure will detect any liquid accumulated in the interspace area between the tank bottoms; and
  - ii. Procedures will promptly determine whether any accumulated liquid is condensation or leaked material;

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- d. The Permittee shall perform periodic tightness tests on the interspace area between the tank bottoms.
  - i. The Permittee shall submit to the Department within eight (8) weeks of the Permit effective date proposed methodology for the tightness test. The Department will have eight (8) weeks from the date the proposed methodology is received to either accept or deny the proposal. Failure to respond within eight (8) weeks will constitute acceptance.
  - ii. Tightness tests in accordance with Permit Condition IV.A.3.d.i. shall be performed within four (4) weeks after method approval by the Department and no less than once every 6 months thereafter.
  - iii. The results of all tightness tests shall be reviewed and certified by an independent, registered professional engineer and maintained in the operating record until facility closure.
  - iv. Any tank for which the interspace area between the tank bottoms cannot be certified as tight shall be immediately taken out of service.

IV.A.4. The Permittee may store or treat dangerous waste in tanks 2701, 2703, and 2705-2708 for six (6) months following the Permit effective date. After six (6) months from the Permit effective date, the Permittee shall not store or treat dangerous waste in tanks 2701, 2703, or 2705-2708 unless all submittals required by Permit Condition IV.A.3. have been approved by the Department, a leak detection system has been installed pursuant to Permit Condition IV.A.3.a., and the initial tightness test pursuant to Permit Condition IV.A.3.D.ii. has been completed and certified. The Permittee may request an extension to the schedule of this condition pursuant to Permit Condition IV.D.

IV.A.5. The Permittee shall notify the Department within 24 hours of discovering any leakage from tanks 2701, 2703, or 2705-2708. If any of these tanks are found to be leaking and if the Permittee wishes to return the tank to service, the Permittee shall notify the Department prior to implementing any repairs as required by Permit Condition III.B.1. The Department may require additional design changes before the tank is returned to service.

IV.B. CONSTRUCTION SCHEDULE

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IV.B.1. The following construction activities shall be completed within the time specified. Time periods shall begin on the effective date of this Permit.

Loading/unloading Pad (See Figure IV-1)

7 months \* Construct pad

Area A (See Figure IV-1)

5 months \* Upgrade secondary containment to meet Permit requirements, remove tanks 106 and 108

14 months \* Install tanks 2702 and 2704

Area B (See Figure IV-1)

5 months \* Upgrade secondary containment to meet Permit requirements

9 months \* Retrofit double bottoms on tanks 2701 and 2703

Area C (See Figure IV-1)

6 months \* Upgrade secondary containment to meet Permit requirements

10 months \* Place tank 2709 into service. Tank 2709 shall be designed and constructed in accordance with all specifications in Figure D1-11, Attachment II; Drawings 43007 and 44006, Appendix D-8 of Attachment II; and the structural and corrosion integrity assessments of Appendix D-9 of Attachment II.

20 months \* Install tank 2307

24 months \* Install tank 2308

28 months \* Install tank 2309



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- 32 months \* Install tank 2310
- 36 months \* Place tank 2710 into service. Tank 2710 shall be designed and constructed in accordance with all specifications in Figure D1-11, Attachment II; Drawings 43007 and 44006, Appendix D-8 of Attachment II; and the structural and corrosion integrity assessments of Appendix D-9 of Attachment II.

IV.B.2. The Permittee shall maintain records of all construction operations occurring in the Permittee's treatment and storage area. Such records may be maintained at the corporate office, but shall be made available at the facility within 24 hours of a request by the Director or an authorized representative. Records shall be maintained until closure and corrective action are complete and certified, and shall include at a minimum:

- a. Daily construction reports;
- b. Photographs of stages of construction work;
- c. Summary or minutes of construction meetings;
- d. Material test results;
- e. As-built designs as certified by a registered professional engineer;
- f. Construction changes as certified by a registered professional engineer; and
- g. All quality control procedures undertaken by the Permittee.

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- IV.B.3. Within 60 days after construction, or a phase of construction, of a new or modified area is complete, the Permittee shall submit to the Department a formal report signed by the Permittee and by an independent, registered professional engineer that certifies that the facility has been constructed in compliance with the Permit.
- i. The report shall incorporate, at a minimum, all of the elements defined in Permit Condition IV.B.2.
  - ii. The Permittee shall not store or treat dangerous waste in the new or modified area until the report has been submitted and the Director or his authorized representative has inspected the facility or waived the inspection pursuant to Permit Condition I.E.9.

IV.C. GENERAL COMPLIANCE REQUIREMENTS

- IV.C.1. The Permittee shall not operate in exceedence of approved Interim Status capacity prior to the completion of all items specified in Permit Condition IV.B.1.
- IV.C.2. The Permittee shall maintain within the Operating Record a map locating each management unit and locating each process, both ongoing and intermittent. The relocation of any processes shall be recorded within the operating record within 5 days of relocation.
- IV.C.3. The Permittee shall allow independent sampling and sample splitting when requested by the Department. At the Permittee's request, the Department will inform the Permittee of all analyses to be performed on split samples.
- IV.C.4. The Permittee shall submit samples for analysis by an independent, accredited laboratory upon request by the Department. Such submittals shall be limited to two (2) events per year, and 12 samples per event.
- IV.C.5. Criteria for the clean up or the prevention of contamination of soil, ground water, surface water, sediments, or air within a spill area shall be at least as stringent as standards for clean closure as defined in Section II.D. of this Permit.
- IV.C.6. Any accumulated precipitation shall be removed from secondary containment systems in as timely a manner as necessary to prevent overflow of sumps; in all cases such removal shall occur at least once every working shift or a minimum of every 24 hours.

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- IV.C.7. The Permittee shall note in the facility operating record the time, date, and details of any incident that requires implementing the contingency plan. Within 15 days after the incident the Permittee shall submit a written report on the incident to the Department. Such a report shall at a minimum include all items specified in WAC 173-303-360(2)(k).
- IV.C.8. The Permittee's treatment and storage area inspections shall include, in addition to all items and procedures specified in Attachment EE, daily inspection of groundwater monitoring wells within secondary containment for pertinent items such as the loss of integrity of surface seals, frost heave, etc.
- IV.C.9. The Permittee shall comply with requirements of the Seattle Fire Department. These requirements include, but are not limited to, the following:
- a. Providing approved automatic fire control equipment to newly installed or refurbished tanks over 110 gallons containing Class I flammable or Class II combustible liquids;
  - b. Submittal and Seattle Fire Department approval of construction plans prior to installation of each above-ground storage tank;
  - c. Meeting tank-to-tank and tank-to-property line separation requirements set forth by the Seattle Fire Code for each tank installation; and
  - d. Acquisition of all required Fire Department permits.
- IV.C.10. All tanks removed from service shall be disposed of in a RCRA permitted hazardous waste disposal facility or decontaminated in accordance with the procedures and standards for tanks in the closure plan, Attachment HH. This shall include the tanks designated under Interim Status as numbers 106, 108, and 113-118.



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IV.D. SCHEDULE EXTENSIONS

IV.D.1. The Permittee shall notify the Department, in writing, as soon as possible of any deviations or expected deviations from any schedules of Parts I through V or Attachments AA through MM of this Permit. The Permittee shall include with the notification all information supporting its claim that it has used best efforts to meet the required schedules. If the Director determines that the Permittee has made best efforts to meet the schedules of this Permit, the Director shall notify the Permittee in writing by certified mail that the Permittee has been granted an extension. Such a revision shall not require a permit modification under WAC 173-303-830. Copies of all letters pursuant to this Permit Condition shall be kept in the Operating Record.

IV.E. TRAFFIC MANAGEMENT

IV.E.1 Whenever a vehicle used for the transport of dangerous waste enters the Permittee's treatment and storage area, a facility employee shall be in such a position that he or she can observe the approach of the vehicle towards the loading/unloading area and can signal to the driver to turn or to stop.

IV.E.2. Vehicles used for the transport of dangerous waste to or from the facility shall be parked only in the designated loading/unloading area while engaged in loading or unloading.

IV.F. CLOSURE OF INTERIM STATUS AREAS

IV.F.1. The Permittee shall close all portions of the Permittee's treatment and storage areas as defined in attachment MM and which are not addressed in the final facility closure plan, Attachment HH.

- a. Closure of these areas shall be conducted in accordance with a closure plan approved by the Department. The Permittee shall submit to the Department a closure plan for these areas within 60 days of the Permit effective date.
- b. Closure of these areas shall meet the all of the closure standards of Permit Condition II.D.7.

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The floor plan shows a large hall divided into three main sections: A, B, and C. Section A is at the top, Section B is in the middle, and Section C is at the bottom. Each section contains several circular tables of different sizes. The plan includes dimensions for the overall hall (150'-0" by 26'-0") and individual sections, as well as door locations and furniture labels.

**Section A:** Contains five large circular tables (F2204, F2205, F2206, F2207, F2208) and two smaller circular tables (F2209, F2210). The section is 150'-0" wide and 26'-0" deep.

**Section B:** Contains three large circular tables (F2201, F2202, F2203) and one smaller circular table (F2204). The section is 150'-0" wide and 26'-0" deep.

**Section C:** Contains two large circular tables (F2201, F2202) and four smaller circular tables (F2203, F2204, F2205, F2206). The section is 150'-0" wide and 26'-0" deep.

The plan also shows the locations of doors and other furniture items.

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PART V - PERMIT BY RULE

V.A. WASTEWATER TREATMENT UNIT

V.A.1. The Permittee may store and treat dangerous wastewater in a wastewater treatment unit(s) as defined in WAC 173-303-040.

V.B. GENERAL CONDITIONS

V.B.1. The Permittee shall design, operate, and maintain the wastewater treatment unit in accordance with the provisions of WAC 173-303-802(5)(a)(i), (ii), and (iii).

V.B.2. The Permittee shall comply with the terms of the Municipality of Metropolitan Seattle (METRO) Industrial Wastewater Discharge Permit Number 7099, or subsequent permit, for the discharge from the wastewater treatment unit(s) unless authorized by METRO due to special circumstances or emergencies.



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**PART VI - CORRECTIVE ACTION**

- VI.A.1. Pursuant to WAC 173-303-645(12) the Permittee shall institute corrective action as necessary to protect human health and the environment for all releases of dangerous waste or constituents from any solid waste management unit, regardless of the time at which waste was placed in such a unit. In order to satisfy this requirement the Permittee shall:
- a. Comply with the requirements of the Agreed Order for this facility, Environmental Protection Agency Docket No. [1089-11-06-3008(h)], for as long as the Agreed Order is in effect. Should corrective measures be required pursuant to the Agreed Order prior to the issuance of the final facility permit referenced in b. below, the permittee shall provide assurance of financial responsibility adequate for completing the corrective measures. Such financial assurance shall be in a form specified by WAC 173-303-620(4) and meet the requirements of WAC 173-303-620(9) and (10).
  - b. Comply with the requirements of a final facility permit issued by the Environmental Protection Agency when that permit supersedes the Agreed Order referenced in a. above.

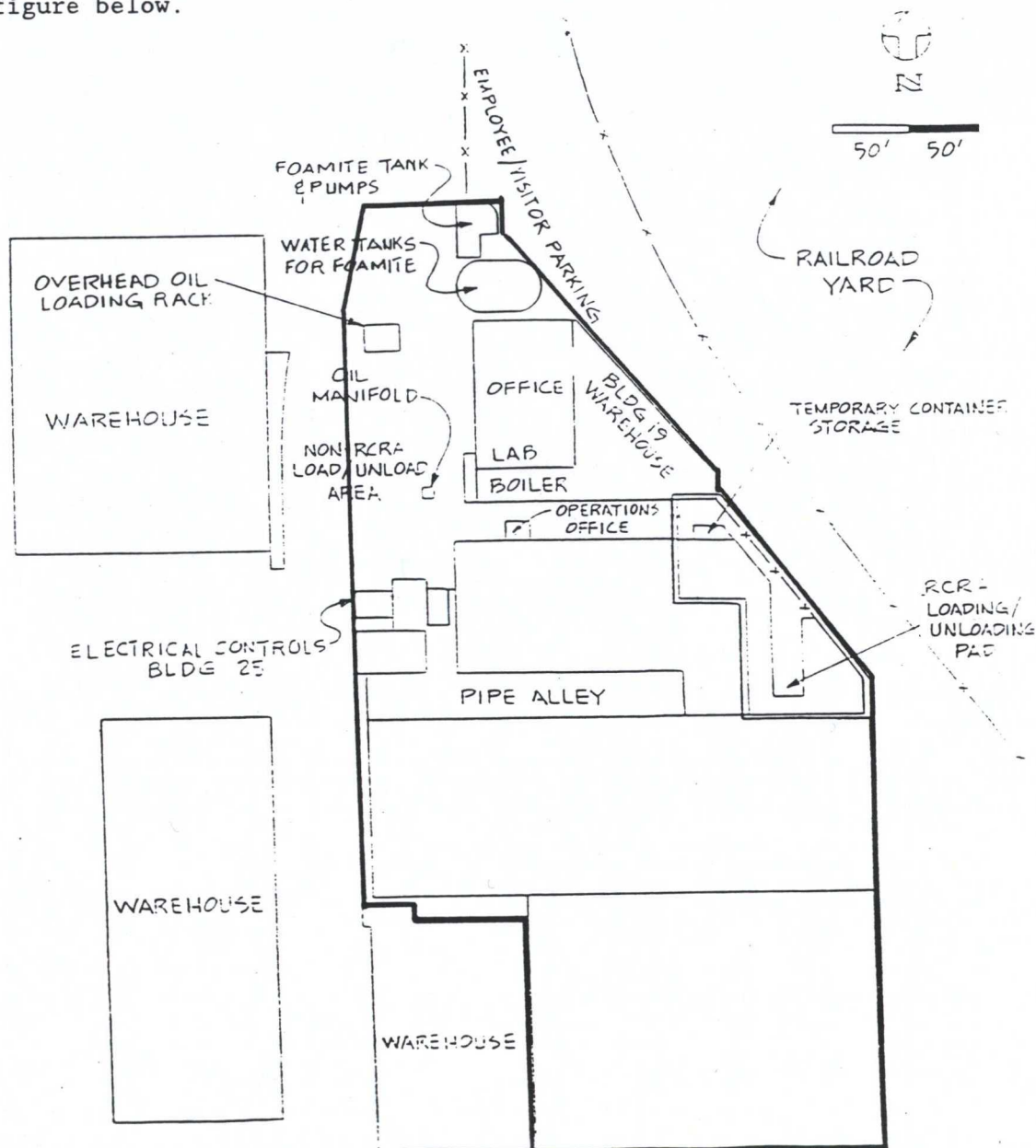
Description of the  
Burlington Environmental Inc.  
Treatment and Storage Area  
at the Pier 91 Facility

**ATTACHMENT MM**

The Burlington Environmental treatment and storage area consists of the following:

1. All areas where Burlington Environmental (formerly Chemical Processors Inc.) has had interim status for dangerous waste management.
2. All areas requested by Burlington Environmental to have final permitted status for dangerous waste management.
3. All solid waste management units on other portions of the contiguous property under Burlington Environmental's control.

The approximate boundary of the treatment and storage area is shown in the figure below.



**List of Analytes for the Pier 91 Part B Closure Plan**

| <u>Analyte</u>   | <u>SW-846 Method</u> | <u>Detection Limit of Liquid<br/>after Distillation, Digestion<br/>or Extraction (ug/l)</u> |
|--|----------------------|---|
| Antimony (Sb)  | 7041                 | 3   |
| Arsenic (As)   | 7060                 | 1   |
| Barium (Ba)  | 6010                 | 2   |
| Beryllium (Be)   | 6010                 | 0.3   |
| Cadmium (Cd)   | 6010                 | 4   |
| Chromium (Cr)  | 6010                 | 7   |
| Copper (Cu)  | 6010                 | 6   |
| Lead (Pb)  | 7421                 | 1   |
| Mercury (Hg)   | 7470 or 7471         | 0.2   |
| Nickel (Ni)  | 6010                 | 15  |
| Selenium (Se)  | 7740                 | 2   |
| Silver (Ag)  | 6010                 | 7   |
| Thallium (Tl)  | 7841                 | 1   |
| Zinc (Zn)  | 6010                 | 2   |
| Sulfide  | 9030                 | (see Method)  |
| PCBs   | 8080                 | (see Method)  |
| TPH  | 418.1 (not SW-846)   | (see Method)  |
| Volatiles<br>(see attached method list of analytes)      | 8240                 | (see Method)  |
| Semi-Volatiles<br>(see attached method list of analytes) | 8270                 | (see Method)  |



## METHOD 6010

### INDUCTIVELY COUPLED PLASMA ATOMIC EMISSION SPECTROSCOPY

#### 1.0 SCOPE AND APPLICATION

1.1 Inductively coupled plasma atomic emission spectroscopy (ICP) determines elements including metals in solution. The method is applicable to a large number of metals and wastes. All matrices, including ground water, aqueous samples, EP extracts, industrial wastes, soils, sludges, sediments, and other solid wastes, require digestion prior to analysis.

1.2 Elements for which Method 6010 is applicable are listed in Table 1. Detection limits, sensitivity, and optimum ranges of the metals will vary with the matrices and model of spectrometer. The data shown in Table 1 provide concentration ranges for clean aqueous samples. Use of this method is restricted to spectroscopists who are knowledgeable in the correction of spectral, chemical, and physical interferences.

1.3 The method of standard addition (MSA) (Paragraph 8.5.3) shall be used for the analysis of all EP extracts and sample digests unless either serial dilution or matrix spike addition demonstrates that it is not required.

#### 2.0 SUMMARY OF METHOD

2.1 Prior to analysis, samples must be solubilized or digested using appropriate Sample Preparation Methods (e.g., Methods 3005-3050).

2.2 Method 6010 describes the simultaneous, or sequential, multielemental determination of elements by ICP. The method measures element-emitted light by optical spectrometry. Samples are nebulized and the resulting aerosol is transported to the plasma torch. Element-specific atomic-line emission spectra are produced by a radio-frequency inductively coupled plasma. The spectra are dispersed by a grating spectrometer, and the intensities of the lines are monitored by photomultiplier tubes. Background correction is required for trace element determination. Background must be measured adjacent to analyte lines on samples during analysis. The position selected for the background-intensity measurement, on either or both sides of the analytical line, will be determined by the complexity of the spectrum adjacent to the analyte line. The position used must be free of spectral interference and reflect the same change in background intensity as occurs at the analyte wavelength measured. Background correction is not required in cases of line broadening where a background correction measurement would actually degrade the analytical result. The possibility of additional interferences named in Section 3.0 should also be recognized and appropriate corrections made; tests for their presence are described in Section 8.5.

TABLE 1. RECOMMENDED WAVELENGTHS AND ESTIMATED INSTRUMENTAL DETECTION LIMITS

| Element               | Wavelength <sup>a</sup> (nm) | Estimated Detection Limit <sup>b</sup> (ug/L) |
|-----------------------|------------------------------|---|
| <del>Aluminum</del>   | <del>308.215</del>           | <del>45</del>                                 |
| <del>Antimony</del>   | <del>206.833</del>           | <del>32</del>                                 |
| <del>Arsenic</del>    | <del>193.696</del>           | <del>53</del>                                 |
| Barium                | 455.403                      | 2   |
| Beryllium             | 313.042                      | 0.3   |
| <del>Boron</del>      | <del>249.773</del>           | <del>5</del>                                  |
| Cadmium               | 226.502                      | 4   |
| <del>Calcium</del>    | <del>317.933</del>           | <del>10</del>                                 |
| Chromium              | 267.716                      | 7   |
| <del>Cobalt</del>     | <del>228.616</del>           | <del>7</del>                                  |
| Copper                | 324.754                      | 6   |
| Iron                  | 259.940                      | 7   |
| Lead                  | 220.353                      | 42  |
| Magnesium             | 279.079                      | 30  |
| <del>Manganese</del>  | <del>257.610</del>           | <del>2</del>                                  |
| <del>Molybdenum</del> | <del>202.030</del>           | <del>8</del>                                  |
| Nickel                | 231.604                      | 15  |
| <del>Potassium</del>  | <del>766.491</del>           | <del>See note c</del>                         |
| Selenium              | 196.026                      | 75  |
| Silicon               | 288.158                      | 58  |
| Silver                | 328.068                      | 7   |
| <del>Sodium</del>     | <del>588.995</del>           | <del>29</del>                                 |
| Thallium              | 190.864                      | 40  |
| <del>Vanadium</del>   | <del>292.402</del>           | <del>8</del>                                  |
| Zinc                  | 213.856                      | 2   |

<sup>a</sup>The wavelengths listed are recommended because of their sensitivity and overall acceptance. Other wavelengths may be substituted if they can provide the needed sensitivity and are treated with the same corrective techniques for spectral interference (see Paragraph 3.1). In time, other elements may be added as more information becomes available and as required.

<sup>b</sup>The estimated instrumental detection limits shown are taken from Reference 1 in Section 10.0 below. They are given as a guide for an instrumental limit. The actual method detection limits are sample dependent and may vary as the sample matrix varies.

<sup>c</sup>Highly dependent on operating conditions and plasma position.



METHOD 7041

ANTIMONY (ATOMIC ABSORPTION, FURNACE TECHNIQUE)

1.0 SCOPE AND APPLICATION

1.1 See Section 1.0 of Method 7000.

2.0 SUMMARY OF METHOD

2.1 See Section 2.0 of Method 7000.

3.0 INTERFERENCES

3.1 See Section 3.0 of Method 7000 if interferences are suspected.

3.2 High lead concentration may cause a measurable spectral interference on the 217.6-nm line. If this interference is expected, the secondary wavelength should be employed or Zeeman background correction used.

4.0 APPARATUS AND MATERIALS

4.1 For basic apparatus, see Section 4.0 of Method 7000.

4.2 Instrument parameters (general):

4.2.1 Drying time and temp: 30 sec at 125°C.

4.2.2 Ashing time and temp: 30 sec at 800°C.

4.2.3 Atomizing time and temp: 10 sec at 2700°C.

4.2.4 Purge gas: Argon or nitrogen.

4.2.5 Wavelength: 217.6 nm (primary); 231.1 nm (alternate).

4.2.6 Background correction: Required.

4.2.7 Other operating parameters should be set as specified by the particular instrument manufacturer.

NOTE: The above concentration values and instrument conditions are for a Perkin-Elmer HGA-2100, based on the use of a 20-uL injection, continuous-flow purge gas, and nonpyrolytic graphite. Smaller sizes of furnace devices or those employing faster rates of atomization can be operated using lower atomization temperatures for shorter time periods than the above-recommended settings.

5.0 REAGENTS

5.1 See Section 5.0 of Method 7000.



## 5.2 Preparation of standards:

5.2.1 Stock solution: Carefully weigh 2.7426 g of antimony potassium tartrate (analytical reagent grade) and dissolve in Type II water. Dilute to 1 liter with Type II water; 1 mL = 1 mg Sb (1,000 mg/L). Alternatively, procure a certified standard from a supplier and verify by comparison with a second standard.

5.2.2 Prepare dilutions of the stock solution to be used as calibration standards at the time of analysis. The calibration standards should contain 0.2% (v/v)  $\text{HNO}_3$  and 1-2% (v/v)  $\text{HCl}$ , prepared using the same types of acid and at the same concentrations as in the sample after processing.

## 6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

6.1 See Chapter Three, Section 3.1.3, Sample Handling and Preservation.

## 7.0 PROCEDURE

7.1 Sample preparation: The procedures for preparation of the sample are given in Method 3005. Method 3005, a soft digestion, is presently the only digestion procedure recommended for Sb. It yields better recoveries than either Method 3010 or Method 3050. There is no hard digestion for Sb at this time.

NOTE: The addition of  $\text{HCl}$  acid to the digestate prevents the furnace analysis of this digestate for many other metals.

7.2 See Method 7000, Paragraph 7.3, Furnace Procedure. The calculation is given in Method 7000, Paragraph 7.4.

## 8.0 QUALITY CONTROL

8.1 See Section 8.0 of Method 7000.

## 9.0 METHOD PERFORMANCE

9.1 Precision and accuracy data are not available at this time.

9.2 The performance characteristics for an aqueous sample free of interferences are:

Optimum concentration range: 20-300 ug/L.

Detection limit: 3 ug/L.

## METHOD 7060

### ARSENIC (ATOMIC ABSORPTION, FURNACE TECHNIQUE)

#### 1.0 SCOPE AND APPLICATION

1.1 Method 7060 is an atomic absorption procedure approved for determining the concentration of arsenic in wastes, mobility procedure extracts, soils, and ground water. All samples must be subjected to an appropriate dissolution step prior to analysis.

#### 2.0 SUMMARY OF METHOD

2.1 Prior to analysis by Method 7060, samples must be prepared in order to convert organic forms of arsenic to inorganic forms, to minimize organic interferences, and to convert the sample to a suitable solution for analysis. The sample preparation procedure varies depending on the sample matrix. Aqueous samples are subjected to the acid digestion procedure described in this method. Sludge samples are prepared using the procedure described in Method 3050.

2.2 Following the appropriate dissolution of the sample, a representative aliquot of the digestate is spiked with a nickel nitrate solution and is placed manually or by means of an automatic sampler into a graphite tube furnace. The sample aliquot is then slowly evaporated to dryness, charred (ashed), and atomized. The absorption of hollow cathode or EDL radiation during atomization will be proportional to the arsenic concentration.

2.3 The typical detection limit for this method is 1 ug/L.

#### 3.0 INTERFERENCES

3.1 Elemental arsenic and many of its compounds are volatile; therefore, samples may be subject to losses of arsenic during sample preparation. Spike samples and relevant standard reference materials should be processed to determine if the chosen dissolution method is appropriate.

3.2 Likewise, caution must be employed during the selection of temperature and times for the dry and char (ash) cycles. A nickel nitrate solution must be added to all digestates prior to analysis to minimize volatilization losses during drying and ashing.

3.3 In addition to the normal interferences experienced during graphite furnace analysis, arsenic analysis can suffer from severe nonspecific absorption and light scattering caused by matrix components during atomization. Arsenic analysis is particularly susceptible to these problems because of its low analytical wavelength (193.7 nm). Simultaneous background



METHOD 7421

LEAD (ATOMIC ABSORPTION, FURNACE TECHNIQUE)

1.0 SCOPE AND APPLICATION

1.1 See Section 1.0 of Method 7000.

2.0 SUMMARY OF METHOD

2.1 See Section 2.0 of Method 7000.

3.0 INTERFERENCES

3.1 See Section 3.0 of Method 7000 if interferences are suspected.

3.2 Background correction is required.

3.3 If poor recoveries are obtained, a matrix modifier may be necessary. Add 10  $\mu$ L of phosphoric acid (Paragraph 5.3) to 1 mL of prepared sample in the furnace sampler cup and mix well.

4.0 APPARATUS AND MATERIALS

4.1 For basic apparatus, see Section 4.0 of Method 7000.

4.2 Instrument parameters (general):

4.2.1 Drying time and temp: 30\*sec at 125°C.

4.2.2 Ashing time and temp: 30\*sec at 500°C.

4.2.3 Atomizing time and temp: 10 sec at 2700°C.

4.2.4 Purge gas: Argon.

4.2.5 Wavelength: 283.3 nm.

4.2.6 Background correction: Required.

4.2.7 Other operating parameters should be set as specified by the particular instrument manufacturer.

NOTE: The above concentration values and instrument conditions are for a Perkin-Elmer HGA-2100, based on the use of a 20- $\mu$ L injection, continuous-flow purge gas, and nonpyrolytic graphite. Smaller sizes of furnace devices or those employing faster rates of atomization can be operated using lower atomization temperatures for shorter time periods than the above-recommended settings.

5.0 REAGENTS

5.1 See Section 5.0 of Method 7000.



## 5.2 Preparation of standards:

5.2.1 Stock solution: Dissolve 1.599 g of lead nitrate,  $\text{Pb}(\text{NO}_3)_2$  (analytical reagent grade), in Type II water, acidify with 10 mL redistilled  $\text{HNO}_3$ , and dilute to 1 liter with Type II water. Alternatively, procure a certified standard from a supplier and verify by comparison with a second standard.

5.2.2 Prepare dilutions of the stock solution to be used as calibration standards at the time of analysis. The calibration standards should be prepared using the same type of acid and at the same concentrations as in the sample after processing (0.5% v/v  $\text{HNO}_3$ ).

5.3 Phosphoric acid: Reagent grade.

## 6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

6.1 See Chapter Three, Section 3.1.3, Sample Handling and Preservation.

## 7.0 PROCEDURE

7.1 Sample preparation: The procedures for preparation of the sample are given in Chapter Three, Section 3.2.

7.2 See Method 7000, Paragraph 7.3, Furnace Procedure. The calculation is given in Method 7000, Paragraph 7.4.

## 8.0 QUALITY CONTROL

8.1 See Section 8.0 of Method 7000.

## 9.0 METHOD PERFORMANCE

9.1 Precision and accuracy data are available in Method 239.2 of Methods for Chemical Analysis of Water and Wastes.

9.2 The performance characteristics for an aqueous sample free of interferences are:

Optimum concentration range: 5-100 ug/L.

Detection limit: 1 ug/L.

9.3 The data shown in Table 1 were obtained from records of state and contractor laboratories. The data are intended to show the precision of the combined sample preparation and analysis method.

## METHOD 7470

### MERCURY IN LIQUID WASTE (MANUAL COLD-VAPOR TECHNIQUE)

#### 1.0 SCOPE AND APPLICATION

1.1 Method 7470 is a cold-vapor atomic absorption procedure approved for determining the concentration of mercury in mobility-procedure extracts, aqueous wastes, and ground waters. (Method 7470 can also be used for analyzing certain solid and sludge-type wastes; however, Method 7471 is usually the method of choice for these waste types.) All samples must be subjected to an appropriate dissolution step prior to analysis.

#### 2.0 SUMMARY OF METHOD

2.1 Prior to analysis, the liquid samples must be prepared according to the procedure discussed in this method.

2.2 Method 7470, a cold-vapor atomic absorption technique, is based on the absorption of radiation at 253.7-nm by mercury vapor. The mercury is reduced to the elemental state and aerated from solution in a closed system. The mercury vapor passes through a cell positioned in the light path of an atomic absorption spectrophotometer. Absorbance (peak height) is measured as a function of mercury concentration.

2.3 The typical detection limit for this method is 0.0002 mg/L.

#### 3.0 INTERFERENCES

3.1 Potassium permanganate is added to eliminate possible interference from sulfide. Concentrations as high as 20 mg/L of sulfide as sodium sulfide do not interfere with the recovery of added inorganic mercury from Type II water.

3.2 Copper has also been reported to interfere; however, copper concentrations as high as 10 mg/L had no effect on recovery of mercury from spiked samples.

3.3 Seawaters, brines, and industrial effluents high in chlorides require additional permanganate (as much as 25 mL) because, during the oxidation step, chlorides are converted to free chlorine, which also absorbs radiation of 253.7 nm. Care must therefore be taken to ensure that free chlorine is absent before the mercury is reduced and swept into the cell. This may be accomplished by using an excess of hydroxylamine sulfate reagent (25 mL). In addition, the dead air space in the BOD bottle must be purged before adding stannous sulfate. Both inorganic and organic mercury spikes have been quantitatively recovered from seawater by using this technique.



## METHOD 7471

### MERCURY IN SOLID OR SEMISOLID WASTE (MANUAL COLD-VAPOR TECHNIQUE)

#### 1.0 SCOPE AND APPLICATION

1.1 Method 7471 is approved for measuring total mercury (organic and inorganic) in soils, sediments, bottom deposits, and sludge-type materials. All samples must be subjected to an appropriate dissolution step prior to analysis.

#### 2.0 SUMMARY OF METHOD

2.1 Prior to analysis, the solid or semi-solid samples must be prepared according to the procedures discussed in this method.

2.2 Method 7471, a cold-vapor atomic absorption method, is based on the absorption of radiation at the 253.7-nm wavelength by mercury vapor. The mercury is reduced to the elemental state and aerated from solution in a closed system. The mercury vapor passes through a cell positioned in the light path of an atomic absorption spectrophotometer. Absorbance (peak height) is measured as a function of mercury concentration.

2.3 The typical detection limit for this method is 0.0002 mg/L.

#### 3.0 INTERFERENCES

3.1 Potassium permanganate is added to eliminate possible interference from sulfide. Concentrations as high as 20 mg/L of sulfide as sodium sulfide do not interfere with the recovery of added inorganic mercury from Type II water.

3.2 Copper has also been reported to interfere; however, copper concentrations as high as 10 mg/L had no effect on recovery of mercury from spiked samples.

3.3 Seawaters, brines, and industrial effluents high in chlorides require additional permanganate (as much as 25 mL) because, during the oxidation step, chlorides are converted to free chlorine, which also absorbs radiation of 253 nm. Care must therefore be taken to ensure that free chlorine is absent before the mercury is reduced and swept into the cell. This may be accomplished by using an excess of hydroxylamine sulfate reagent (25 mL). In addition, the dead air space in the BOD bottle must be purged before adding stannous sulfate. Both inorganic and organic mercury spikes have been quantitatively recovered from seawater by using this technique.

3.4 Certain volatile organic materials that absorb at this wavelength may also cause interference. A preliminary run without reagents should determine if this type of interference is present.



## METHOD 7740

### SELENIUM (ATOMIC ABSORPTION, FURNACE TECHNIQUE)

#### 1.0 SCOPE AND APPLICATION

1.1 Method 7740 is an atomic absorption procedure approved for determining the concentration of selenium in wastes, mobility-procedure extracts, soils, and ground water. All samples must be subjected to an appropriate dissolution step prior to analysis.

#### 2.0 SUMMARY OF METHOD

2.1 Prior to analysis by Method 7740, samples must be prepared in order to convert organic forms of selenium to inorganic forms, to minimize organic interferences, and to convert samples to suitable solutions for analysis. The sample-preparation procedure varies, depending on the sample matrix. Aqueous samples are subjected to the acid-digestion procedure described in this method. Sludge samples are prepared using the procedure described in Method 3050.

2.2 Following the appropriate dissolution of the sample, a representative aliquot is placed manually or by means of an automatic sampler into a graphite tube furnace. The sample aliquot is then slowly evaporated to dryness, charred (ashed), and atomized. The absorption of lamp radiation during atomization will be proportional to the selenium concentration.

2.3 The typical detection limit for this method is 2 ug/L.

#### 3.0 INTERFERENCES

3.1 Elemental selenium and many of its compounds are volatile; therefore, samples may be subject to losses of selenium during sample preparation. Spike samples and relevant standard reference materials should be processed to determine if the chosen dissolution method is appropriate.

3.2 Likewise, caution must be employed during the selection of temperature and times for the dry and char (ash) cycles. A nickel nitrate solution must be added to all digestates prior to analysis to minimize volatilization losses during drying and ashing.

3.3 In addition to the normal interferences experienced during graphite furnace analysis, selenium analysis can suffer from severe nonspecific absorption and light scattering caused by matrix components during atomization. Selenium analysis is particularly susceptible to these problems because of its low analytical wavelength (196.0 nm). Simultaneous background correction is required to avoid erroneously high results. High iron levels can give overcorrection with deuterium background. Zeeman background correction can be useful in this situation.

THALLIUM (ATOMIC ABSORPTION, FURNACE TECHNIQUE)

1.0 SCOPE AND APPLICATION

1.1 See Section 1.0 of Method 7000.

2.0 SUMMARY OF METHOD

2.1 See Section 2.0 of Method 7000.

3.0 INTERFERENCES

3.1 See Section 3.0 of Method 7000 if interferences are suspected.

3.2 Background correction is required.

3.3 Hydrochloric acid or excessive chloride will cause volatilization of thallium at low temperatures. Verification that losses are not occurring, by spiked samples or standard additions, must be made for each sample matrix.

3.4 Palladium is a suitable matrix modifier for thallium analysis.

4.0 APPARATUS AND MATERIALS

4.1 For basic apparatus, see Section 4.0 of Method 7000.

4.2 Instrument parameters (general):

4.2.1 Drying time and temp: 30 sec at 125°C.

4.2.2 Ashing time and temp: 30 sec at 400°C.

4.2.3 Atomizing time and temp: 10 sec at 2400°C.

4.2.4 Purge gas: Argon or nitrogen.

4.2.5 Wavelength: 276.8 nm.

4.2.6 Background correction: Required.

4.2.7 Other operating parameters should be set as specified by the particular instrument manufacturer.

NOTE: The above concentration values and instrument conditions are for a Perkin-Elmer HGA-2100, based on the use of a 20-uL injection, continuous-flow purge gas, and nonpyrolytic graphite. Smaller sizes of furnace devices or those employing faster rates of atomization can be operated using lower atomization temperatures for shorter time periods than the above-recommended settings.



## 5.0 REAGENTS

5.1 See Section 5.0 of Method 7000.

### 5.2 Preparation of standards:

5.2.1 Stock solution: Dissolve 1.303 g thallium nitrate,  $TlNO_3$  (analytical reagent grade), in Type II water, acidify with 10 mL concentrated  $HNO_3$ , and dilute to 1 liter with Type II water. Alternatively, procure a certified standard from a supplier and verify by comparison with a second standard.

5.2.2 Prepare dilutions of the stock solution to be used as calibration standards at the time of analysis. The calibration standards should be prepared using the same type of acid and at the same concentrations as in the sample after processing (0.5% v/v  $HNO_3$ ).

5.3 Palladium chloride: Weigh 0.25 g of  $PdCl_2$  to the nearest 0.0001 g. Dissolve in 10 mL of 1:1  $HNO_3$  and dilute to 1 liter with Type II water. Use equal volumes of sample and palladium solution.

## 6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

6.1 See Chapter Three, Section 3.1.3, Sample Handling and Preservation.

## 7.0 PROCEDURE

7.1 Sample preparation: The procedures for preparation of the sample are given in Chapter Three, Section 3.2.

7.2 See Method 7000, Paragraph 7.3, Furnace Procedure. The calculation is given in Method 7000, Paragraph 7.4.

## 8.0 QUALITY CONTROL

8.1 See Section 8.0 of Method 7000.

## 9.0 METHOD PERFORMANCE

9.1 Precision and accuracy data are not available at this time.

9.2 The performance characteristics for an aqueous sample free of interferences are:

Optimum concentration range: 5-100 ug/L.  
Detection limit: 1 ug/L.



GAS CHROMATOGRAPHY/MASS SPECTROMETRY FOR VOLATILE ORGANICS

## 1.0 SCOPE AND APPLICATION

1.1 Method 8240 is used to determine volatile organic compounds in a variety of solid waste matrices. This method is applicable to nearly all types of samples, regardless of water content, including ground water, aqueous sludges, caustic liquors, acid liquors, waste solvents, oily wastes, mousses, tars, fibrous wastes, polymeric emulsions, filter cakes, spent carbons, spent catalysts, soils, and sediments.

1.2 Method 8240 can be used to quantify most volatile organic compounds that have boiling points below 200°C [vapor pressure is approximately equal to mm Hg @ 25°C] and that are insoluble or slightly soluble in water. Volatile water-soluble compounds can be included in this analytical technique, however, for the more soluble compounds, quantitation limits are approximately ten times higher because of poor purging efficiency. The method is also limited to compounds that elute as sharp peaks from a GC column packed with graphitized carbon lightly coated with a carbowax. Such compounds include low-molecular-weight halogenated hydrocarbons, aromatics, ketones, nitriles, acetates, acrylates, ethers, and sulfides. See Table 1 for a list of compounds, retention times, and their characteristic ions that have been evaluated on a purge-and-trap GC/MS system.

1.3 The practical quantitation limit (PQL) of Method 8240 for an individual compound is approximately 5 ug/kg (wet weight) for soil/sediment samples, 0.5 mg/kg (wet weight) for wastes, and 5 ug/L for ground water (see Table 2). PQLs will be proportionately higher for sample extracts and samples that require dilution or reduced sample size to avoid saturation of the detector.

1.4 Method 8240 is based upon a purge-and-trap, gas chromatographic/mass spectrometric (GC/MS) procedure. This method is restricted to use by, or under the supervision of, analysts experienced in the use of purge-and-trap systems and gas chromatograph/mass spectrometers, and skilled in the interpretation of mass spectra and their use as a quantitative tool.

1.5 To increase purging efficiencies of acrylonitrile and acrolein, refer to Methods 5030 and 8030 for proper purge-and-trap conditions.

## 2.0 SUMMARY OF METHOD

2.1 The volatile compounds are introduced into the gas chromatograph by the purge-and-trap method or by direct injection (in limited applications). The components are separated via the gas chromatograph and detected using a mass spectrometer, which is used to provide both qualitative and quantitative information. The chromatographic conditions, as well as typical mass spectrometer operating parameters, are given.

TABLE 2. PRACTICAL QUANTITATION LIMITS (PQL) FOR VOLATILE ORGANICS<sup>a</sup>

| Volatiles                      | CAS Number | Practical Quantitation Limits <sup>b</sup> |                   |
|--------------------------------|------------|--|-------------------|
|                                |            | Ground water                               | Low Soil/Sediment |
|                                |            | ug/L                                       | ug/Kg             |
| ✓1. Chloromethane              | 74-87-3    | 10   | 10                |
| ✓2. Bromomethane               | 74-83-9    | 10   | 10                |
| ✓3. Vinyl Chloride             | 75-01-4    | 10   | 10                |
| ✓4. Chloroethane               | 75-00-3    | 10   | 10                |
| ✓5. Methylene Chloride         | 75-09-2    | 5  | 5                 |
| 6. Acetone                     | 67-64-1    | 100  | 100               |
| 7. Carbon Disulfide            | 75-15-0    | 5  | 5                 |
| ✓8. 1,1-Dichloroethene         | 75-35-4    | 5  | 5                 |
| ✓9. 1,1-Dichloroethane         | 75-35-3    | 5  | 5                 |
| ✓10. trans-1,2-Dichloroethene  | 156-60-5   | 5  | 5                 |
| ✓11. Chloroform                | 67-66-3    | 5  | 5                 |
| ✓12. 1,2-Dichloroethane        | 107-06-2   | 5  | 5                 |
| 13. 2-Butanone                 | 78-93-3    | 100  | 100               |
| ✓14. 1,1,1-Trichloroethane     | 71-55-6    | 5  | 5                 |
| ✓15. Carbon Tetrachloride      | 56-23-5    | 5  | 5                 |
| 16. Vinyl Acetate              | 108-05-4   | 50   | 50                |
| ✓17. Bromodichloromethane      | 75-27-4    | 5  | 5                 |
| ✓18. 1,1,2,2-Tetrachloroethane | 79-34-5    | 5  | 5                 |
| ✓19. 1,2-Dichloropropane       | 78-87-5    | 5  | 5                 |
| 20. trans-1,3-Dichloropropene  | 10061-02-6 | 5  | 5                 |
| ✓21. Trichloroethene           | 79-01-6    | 5  | 5                 |
| ✓22. Dibromochloromethane      | 124-48-1   | 5  | 5                 |
| ✓23. 1,1,2-Trichloroethane     | 79-00-5    | 5  | 5                 |
| ✓24. Benzene                   | 71-43-2    | 5  | 5                 |
| 25. cis-1,3-Dichloropropene    | 10061-01-5 | 5  | 5                 |
| ✓26. 2-Chloroethyl Vinyl Ether | 110-75-8   | 10   | 10                |
| ✓27. Bromoform                 | 75-25-2    | 5  | 5                 |
| 28. 2-Hexanone                 | 591-78-6   | 50   | 50                |
| ✓29. 4-Methyl-2-pentanone      | 108-10-1   | 50   | 50                |
| ✓30. Tetrachloroethene         | 127-18-4   | 5  | 5                 |



TABLE 2. - Continued

| Volatiles         | CAS Number | Practical Quantitation Limits <sup>b</sup> |                   |
|-------------------|------------|--|-------------------|
|                   |            | Ground water                               | Low Soil/Sediment |
|                   |            | ug/L                                       | ug/Kg             |
| 31. Toluene       | 108-88-3   | 5  | 5                 |
| 32. Chlorobenzene | 108-90-7   | 5  | 5                 |
| 33. Ethyl Benzene | 100-41-4   | 5  | 5                 |
| 34. Styrene       | 100-42-5   | 5  | 5                 |
| 35. Total Xylenes |            | 5  | 5                 |

<sup>a</sup>Sample PQLs are highly matrix-dependent. The PQLs listed herein are provided for guidance and may not always be achievable. See the following information for further guidance on matrix-dependent PQLs.

<sup>b</sup>PQLs listed for soil/sediment are based on wet weight. Normally data is reported on a dry weight basis; therefore, PQLs will be higher, based on the % moisture in each sample.

| <u>Other Matrices:</u>      | <u>Factor<sup>1</sup></u> |
|-----------------------------|---------------------------|
| Water miscible liquid waste | 50                        |
| High-level soil & sludges   | 125                       |
| Non-water miscible waste    | 500                       |

<sup>1</sup>PQL = [PQL for ground water (Table 2)] X [Factor]. For non-aqueous samples, the factor is on a wet-weight basis.



GAS CHROMATOGRAPHY/MASS SPECTROMETRY FOR SEMIVOLATILE ORGANICS:  
CAPILLARY COLUMN TECHNIQUE

## 1.0 SCOPE AND APPLICATION

1.1 Method 8270 is used to determine the concentration of semivolatile organic compounds in extracts prepared from all types of solid waste matrices, soils, and ground water. Direct injection of a sample may be used in limited applications.

1.2 Method 8270 can be used to quantify most neutral, acidic, and basic organic compounds that are soluble in methylene chloride and capable of being eluted without derivatization as sharp peaks from a gas chromatographic fused-silica capillary column coated with a slightly polar silicone. Such compounds include polynuclear aromatic hydrocarbons, chlorinated hydrocarbons and pesticides, phthalate esters, organophosphate esters, nitrosamines, haloethers, aldehydes, ethers, ketones, anilines, pyridines, quinolines, aromatic nitro compounds, and phenols, including nitrophenols. See Table 1 for a list of compounds and their characteristic ions that have been evaluated on the specified GC/MS system.

1.3 The following compounds may require special treatment when being determined by this method. Benzidine can be subject to oxidative losses during solvent concentration. Also, chromatography is poor. Under the alkaline conditions of the extraction step,  $\alpha$ -BHC,  $\gamma$ -BHC, endosulfan I and II, and endrin are subject to decomposition. Neutral extraction should be performed if these compounds are expected. Hexachlorocyclopentadiene is subject to thermal decomposition in the inlet of the gas chromatograph, chemical reaction in acetone solution, and photochemical decomposition. N-nitrosodimethylamine is difficult to separate from the solvent under the chromatographic conditions described. N-nitrosodiphenylamine decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine. Pentachlorophenol, 2,4-dinitrophenol, 4-nitrophenol, 4,6-dinitro-2-methylphenol, 4-chloro-3-methylphenol, benzoic acid, 2-nitroaniline, 3-nitroaniline, 4-chloroaniline, and benzyl alcohol are subject to erratic chromatographic behavior, especially if the GC system is contaminated with high boiling material.

1.4 The practical quantitation limit (PQL) of Method 8270 for determining an individual compound is approximately 1 mg/kg (wet weight) for soil/sediment samples, 1-200 mg/kg for wastes (dependent on matrix and method of preparation), and 10 ug/L for ground water samples (see Table 2). PQLs will be proportionately higher for sample extracts that require dilution to avoid saturation of the detector.

1.5 This method is restricted to use by or under the supervision of analysts experienced in the use of gas chromatograph/mass spectrometers and skilled in the interpretation of mass spectra. Each analyst must demonstrate the ability to generate acceptable results with this method.

TABLE 2. PRACTICAL QUANTITATION LIMITS (PQL) FOR SEMIVOLATILE ORGANICS\*\*

| Semivolatiles                 | CAS Number | Practical Quantitation Limits* |                                |
|-------------------------------|------------|--------------------------------|--------------------------------|
|                               |            | Ground Water                   | Low Soil/Sediment <sup>1</sup> |
|                               |            | ug/L                           | ug/Kg                          |
| ✓Phenol                       | 108-95-2   | 10                             | 660                            |
| ✓bis(2-Chloroethyl) ether     | 111-44-4   | 10                             | 660                            |
| ✓2-Chlorophenol               | 95-57-8    | 10                             | 660                            |
| ✓1,3-Dichlorobenzene          | 541-73-1   | 10                             | 660                            |
| ✓1,4-Dichlorobenzene          | 106-46-7   | 10                             | 660                            |
| Benzyl Alcohol                | 100-51-6   | 20                             | 1300                           |
| ✓1,2-Dichlorobenzene          | 95-50-1    | 10                             | 660                            |
| 2-Methylphenol                | 95-48-7    | 10                             | 660                            |
| ✓bis(2-Chloroisopropyl) ether | 39638-32-9 | 10                             | 660                            |
| 4-Methylphenol                | 106-44-5   | 10                             | 660                            |
| ✓N-Nitroso-Di-N-propylamine   | 621-64-7   | 10                             | 660                            |
| ✓Hexachloroethane             | 67-72-1    | 10                             | 660                            |
| ✓Nitrobenzene                 | 98-95-3    | 10                             | 660                            |
| ✓Isophorone✓                  | 78-59-1    | 10                             | 660                            |
| ✓2-Nitrophenol                | 88-75-5    | 10                             | 660                            |
| ✓2,4-Dimethylphenol           | 105-67-9   | 10                             | 660                            |
| Benzoic Acid                  | 65-85-0    | 50                             | 3300                           |
| ✓bis(2-Chloroethoxy) methane  | 111-91-1   | 10                             | 660                            |
| ✓2,4-Dichlorophenol           | 120-83-2   | 10                             | 660                            |
| ✓1,2,4-Trichlorobenzene       | 120-82-1   | 10                             | 660                            |
| ✓Naphthalene✓                 | 91-20-3    | 10                             | 660                            |
| 4-Chloroaniline               | 106-47-8   | 20                             | 1300                           |
| Hexachlorobutadiene           | 87-68-3    | 10                             | 660                            |
| ✓4-Chloro-3-methylphenol      | 59-50-7    | 20                             | 1300                           |
| 2-Methylnaphthalene           | 91-57-6    | 10                             | 660                            |
| ✓Hexachlorocyclopentadiene    | 77-47-4    | 10                             | 660                            |
| ✓2,4,6-Trichlorophenol        | 88-06-2    | 10                             | 660                            |
| 2,4,5-Trichlorophenol         | 95-95-4    | 10                             | 660                            |



TABLE 2. PRACTICAL QUANTITATION LIMITS (PQL) FOR SEMIVOLATILE ORGANICS\*\*  
(Continued)

| Semivolatiles                | CAS Number | Practical Quantitation Limits* |                                |
|------------------------------|------------|--------------------------------|--------------------------------|
|                              |            | Ground Water                   | Low Soil/Sediment <sup>1</sup> |
|                              |            | ug/L                           | ug/Kg                          |
| ✓2-Chloronaphthalene         | 91-58-7    | 10                             | 660                            |
| 2-Nitroaniline               | 88-74-4    | 50                             | 3300                           |
| ✓Dimethyl phthalate          | 131-11-3   | 10                             | 660                            |
| ✓Acenaphthylene              | 208-96-8   | 10                             | 660                            |
| 3-Nitroaniline               | 99-09-2    | 50                             | 3300                           |
| ✓Acenaphthene                | 83-32-9    | 10                             | 660                            |
| ✓2,4-Dinitrophenol           | 51-28-5    | 50                             | 3300                           |
| ✓4-Nitrophenol               | 100-02-7   | 50                             | 3300                           |
| Dibenzofuran                 | 132-64-9   | 10                             | 660                            |
| ✓2,4-Dinitrotoluene          | 121-14-2   | 10                             | 660                            |
| ✓2,6-Dinitrotoluene          | 606-20-2   | 10                             | 660                            |
| ✓Diethylphthalate            | 84-66-2    | 10                             | 660                            |
| ✓4-Chlorophenyl phenyl ether | 7005-72-3  | 10                             | 660                            |
| ✓Fluorene                    | 86-73-7    | 10                             | 660                            |
| 4-Nitroaniline               | 100-01-6   | 50                             | 3300                           |
| ✓4,6-Dinitro-2-methylphenol  | 534-52-1   | 50                             | 3300                           |
| ✓N-Nitrosodiphenylamine      | 86-30-6    | 10                             | 660                            |
| ✓4-Bromophenyl phenyl ether  | 101-55-3   | 10                             | 660                            |
| ✓Hexachlorobenzene           | 118-74-1   | 10                             | 660                            |
| ✓Pentachlorophenol           | 87-86-5    | 50                             | 3300                           |
| ✓Phenanthrene                | 85-01-8    | 10                             | 660                            |
| ✓Anthracene                  | 120-12-7   | 10                             | 660                            |
| ✓Di-n-butylphthalate         | 84-74-2    | 10                             | 660                            |
| ✓Fluoranthene                | 206-44-0   | 10                             | 660                            |
| ✓Pyrene                      | 129-00-0   | 10                             | 660                            |
| ✓Butyl benzyl phthalate      | 85-68-7    | 10                             | 660                            |
| ✓3,3'-Dichlorobenzidine      | 91-94-1    | 20                             | 1300                           |
| ✓Benzo(a)anthracene          | 56-55-3    | 10                             | 660                            |
| ✓bis(2-ethylhexyl)phthalate  | 117-81-7   | 10                             | 660                            |